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Harvests in various fisheries for salmonids and environmental conditions in Labrador, 2003

Captures dans diverses pêches de salmonidés et conditions environnementales dans le Labrador en 2003

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Abstract

This paper summarizes information on angling and subsistence fisheries catch statistics for Labrador in 2003 along with environmental data collected at gauging stations on selected rivers. Total return information was summarised from counting facilities. Subsistence fisheries in Labrador recorded landings of 8,653 Atlantic salmon weighing 22,108 kg, 11,616 Arctic charr weighing 15,048 kg, and 14,438 sea brook trout weighing 11,619 kg. Landings recorded by the angling fishery were 2,045 small salmon retained, 5,846 small salmon released, 226 large salmon retained and 1,578 large salmon released. In general, water levels in Labrador rivers were below average in the north and average to below average in the south with several spates. Low water continued well into the fall.

Résumé

Ce document présente un résumé des statistiques sur les prises des pêches sportives et des pêches de subsistance pratiquées au Labrador en 2003, ainsi que des données sur les conditions environnementales recueillies à des stations hydrométriques installées dans certaines rivières. Les renseignements sur les remontes totales proviennent des barrières de dénombrement. Les pêcheurs de subsistance ont capturé 8 653 saumons atlantiques (pesant 22 108 kg), 11 616 ombles chevaliers (pesant 15 048 kg) et 14 438 truites de mer (pesant 11 619 kg), tandis que les pêcheurs sportifs ont gardé 2 045 petits saumons et 226 gros saumons et relâché 5 846 petits saumons et 1 578 gros saumons. En général, les niveaux d'eau dans les rivières du Labrador étaient inférieurs à la moyenne dans le secteur nord et moyens à au-dessous de la moyenne dans le secteur sud, plusieurs crues s'étant aussi produites. L'eau est restée à de faibles niveaux jusque tard à l'automne.

INTRODUCTION

In 1992, several major changes were introduced to the management of Atlantic salmon (*Salmo salar* L.) in Newfoundland and Labrador. A five-year moratorium was placed on commercial salmon fishing in the island portion of the province. Quotas for the Labrador commercial fishery, first introduced in 1990, were further reduced and a voluntary retirement of commercial salmon licences was instituted for all of the province. Beginning in 1997, the commercial fishery was closed in the Straits area of Labrador in Salmon Fishing Area (SFA) 14B and then in 1998, it was closed in the remaining SFAs 1 & 2 (Fig. 1). Fishers were offered a buyout which most accepted.

In response to the Supreme Court of Canada decision interpreting Section 35 of the Constitution Act of 1982, the Department of Fisheries and Oceans provided resource access to Aboriginal groups for food, social and ceremonial purposes (FSC). In 1999-2003, a FSC or subsistence fishery of 10 tonnes was available for members of the Labrador Inuit Association including Lake Melville, which is also in SFA 1. The Innu Nation fishes for salmon in Lake Melville and from the community of Natuashish and generally restrict themselves to harvests of around three tonnes. Beginning in 2000 and continuing into 2003, residents of Labrador were allowed to fish in the sea for brook trout (*Salvelinus fontinalis* Mitchill) and Arctic charr (*Salvelinus alpinus* L.) with a permitted bycatch of four salmon for the season. The west Greenland commercial salmon fishery, which was closed for the 1993 and 1994 fishing seasons, was re-opened in 1995 and closed again in 1999, leaving only a small subsistence fishery in 2000. In 2001, the commercial Greenland fishery was opened with a structured quota system that depended on abundance based on in-season catches and historical averages to determine potential landings. Although there have been no recent tagging studies to document the distribution of Labrador salmon at sea, some Labrador origin multi-sea winter salmon may be caught in the Greenland fishery similar to what was shown for Labrador stocks in earlier studies by Pratt et al. (1974). In 2002-2003, the Greenland fishery was restricted to a local fishery of 22 tonnes.

There are also harvests of salmon in the angling fishery in Labrador. In 1992 and 1993, a quota on the number of fish that could be retained was introduced. The quota was assigned for an entire SFA and was not administered on an individual river basis. Only hook-and-release fishing was permitted after the quota was caught. In 1994, quotas for the angling fishery were eliminated. In place of quotas, for Labrador, the season bag limit for retained salmon was lowered from eight to six fish, only two of which could be large salmon. In 1995 and 1996, the season bag limit for the angling fishery remained at six fish but only one large salmon could be retained. In 1999 and 2000, the angling fishery was restricted to a seasonal limit of four salmon retained, one of which could be large, and a daily limit of four salmon could be hooked-and-released. In 1999, use of barbless hooks became mandatory. In 2001, as part of a 2001-2005 Management Plan, several additional rivers in southern Labrador crossed by the new Trans Labrador Highway were added to the list of scheduled rivers and restricted to individual bag limits of two small salmon retained. The Management Plan remained the same in 2003 as in 2002.

The purpose of this paper is to document harvests of salmon in subsistence and angling fisheries and to describe environmental conditions in Labrador in 2003.

METHODS

Angling fisheries

Catch and effort data from the angling fishery in northern (SFA 1) and southern Labrador (SFA 2) were collected by Department of Fisheries and Oceans (DFO) enforcement staff in conjunction with angling reports submitted by commercial sports camp operators and processed by DFO Science Branch (Fig. 1). Procedures for the collection and compilation of angling and commercial fishery data are described by Ash and O'Connell (1987). For purposes of separating 2SW salmon from 1SW salmon in angling fisheries, small salmon are defined as those salmon less than 63 cm and will be mainly 1SW (grilse) in age. Large salmon are those salmon equal to or greater than 63 cm and will be mainly 2SW and older in age.

In 1994, a new system, viz. the License Stub Return System (LSRS) was initiated for collecting angling statistics in Newfoundland and Labrador. It is based on attaching to the provincial angling licence a detachable stub upon which the angler can record details of where and when the fishing activity took place, and the numbers of salmon caught and released (O'Connell et al. 1998). Because of concerns over a lack of comparability of DFO angling statistics and the LSRS data, C&P staff and camp operator data will continue to be used for Labrador in SFA 1. For SFA 2, a blend of LSRS and camp operator data was used; whereby camp operator data was used for Eagle and Sand Hill rivers and LSRS data for all other rivers. For SFA 14B rivers, the catch statistics for 1996-2003 were derived from the License Stub Return System. All 2003 year statistics are preliminary. Tags were issued to anglers that when attached to a salmon could be used to identify legally caught fish.

The Management Plan for the angling fishery in Labrador was as follows:

> Season: 15 June to 15 September
>
> Catch limits: four salmon per season, one of which can be large; except on Class III rivers where only two small salmon could be retained for the season
>
> Hook & release limits: four per day

Subsistence fisheries

In 2003, there were three subsistence fisheries harvesting salmonids in Labrador: 1 – LIA (Labrador Inuit Association) fishery in Lake Melville and in the northern Labrador coastal communities of Rigolet, Makkovik, Hopedale, Postville, and Nain; 2 – Innu Nation fishery in Natuashish and in Lake Melville from the community of Sheshatshiu;

and, 3 – Labrador resident fishery in Lake Melville and coastal communities in southern Labrador from Cartwright to Cape St. Charles. The LIA and Innu fisheries were self-regulated by Aboriginal Fishery Guardians hired by these groups and the resident fishery was regulated by DFO Fishery Officers and Guardian staff. For the LIA and resident fisheries, tags for salmon were issued on an individual fisher basis to identify legally caught fish. Catch statistics were derived from logbooks issued to each fisher. The Innu Nation guardians collected catch statistics by maintaining a daily record of landings per family. Total catches were estimated by adjusting the logbook catches proportionately to the number of fishers reporting out of the total licenced/designated.

A summary of the year 2003 Management Plans for the three subsistence fisheries as they pertain to salmon follows:

LIA

The conditions for the LIA Communal fishery were as follows:

Catch limits: up to ten salmon per licence, 10 tonnes of salmon for the season
Seasons: May 16 to July 12 and July 22 to August 16 in Goose Bay, North West River and Mud Lake, May 16 to August 30 in Rigolet, June 2 to August 30 in Makkovik and Postville, June 2 to September 30 in Hopedale and Nain.

INNU NATION

The Community Guidelines for the Innu Nation fishery were as follows:

Catch limits: thirty salmon per household with a 1,500 salmon community total for the season.
Season: mid-June to end of 1st week of August and mid-June to end of July for Sheshatshiu in Lake Melville.

LABRADOR RESIDENT

The Management Plan for the Labrador Resident fishery was as follows:

Catch limits: a limit of 50 trout and a by-catch of four salmon for the fishing season.

Seasons: July 14 to August 2 (Fish Cove Point to Bolsters Rock) and July 14 to July 26 (Bolsters Rock to Cape Charles) in southern Labrador, June 15 to July 1 and July 24 to August 8 in Lake Melville and June 15 to July 1 (Cape Rouge to Davis Inlet) and July 2 to July 23 (Davis Inlet to Cape Chidley) in northern Labrador.

Total returns to rivers

Total returns to rivers in Labrador are available for six river systems and one tributary. Total returns have been previously reported by Lowe & Mullins (1996) for Forteau Brook and Mullins & Caines (1998) for Pinware River (updated by Mullins, pers. comm.), by Reddin et al. (1996) for Sand Hill River, by Reddin & Short (2000) for Big Brook, and by Reddin et al. (2000) for English River. In 2002, there was a counting fence in operation on Muddy Bay Brook (Dykes River) for the first time. The counting fence on Southwest Brook, a tributary to Paradise River, was in operation since 1998. However, this counting facility was not in operation in 2000. Total returns to rivers include counts at counting fence traps plus downstream angling catches including estimates of hook and release mortalities, which are assessed at 10% of the number of salmon hooked and released.

Environmental data

Environmental data consisting of water flow conditions are collected annually from a system of gauging stations set on various rivers which are operated by Environment Canada. Several of these stations have automated data collection platforms with provision for downloading data via satellite. The Province of Newfoundland and Labrador through the Department of Environment and Labour is responsible for downloading the data and provides it in near-real time; albeit with no quality control. Data are archived by Environment Canada after quality control and made available from the Environment Canada Hydat CD-Rom for the period of record up to and including 1997. Flow data from Alexis, Eagle and Ugjoktok rivers were selected to be representative of conditions on Labrador salmon rivers in 2003.

RESULTS & DISCUSSION

Angling fishery data

In SFA 1, the total catch (small and large salmon combined) of 1,620 increased over 2002 by 108% (Table 1). In SFA 2, the total catch of 4,927 was similar to that of 2002 (Table 2). In SFA 14B, the total catch of 3,148 was 21% higher than in 2002 (Table 3). In 2003, the total Labrador angling catch in all SFAs was 9,695 salmon including hooked and released fish which was 17% higher than levels experienced in 2002 but remained higher than in previous years excluding 2000 with a total catch of 11,364 (Table 4). The catch of small salmon was 7,891 (2,045 retained and 5,846 released) and large salmon was 1,804 (226 retained and 1,578 released). The proportion of salmon released by anglers in Labrador, which has been increasing in recent years, was 77% of the total catch. In total, there were 7,424 small and large salmon reported to have been hooked and released in 2003 (Tables 1-4).

Subsistence fisheries data

In 2003, the following preliminary landings (as of 6 October 2004) of salmon were reported for the subsistence fisheries in Labrador:

	Small salmon		Large salmon		Total	
	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)
Northern Labrador & Lake Melville (SFA 1)						
LIA	3,906	8,078	1,415	6,151	5,321	14,229
Innu	277	617	153	603	430	1,220
Resident	199	400	71	272	270	672
Total	4,382	9,095	1,639	7,026	6,021	16,121
Southern Labrador (SFA 2)						
Resident	2,095	4,102	537	1,885	2,632	5,987
TOTAL	6,477	13,196	2,175	8,912	8,653	22,108

In total, there were about 8, 653 salmon reported by subsistence fisheries in Labrador with a total weight of about 22,108 kg, which is an increase of 4,536 kg over 2002. This increase was due to higher catches in the LIA fishery in 2003. Reporting rates for the various fisheries were 94% for the Innu Nation fishery in Sheshatshiu, 74% for the LIA fishery in Lake Melville and northern Labrador and 80% for the resident fishery in Lake Melville and southern Labrador.

In 2003, preliminary landing information (as of 6 October 2004) is also available for charr and trout from the Resident, LIA and Innu Fisheries:

	Charr		Trout	
SFA	**Number**	**Weight (kg)**	**Number**	**Weight (kg)**
1	6,574	9,727	8,028	6,355
2	5,042	5,322	6,410	5,264
Total	11,616	15,048	14,438	11,619

In total, there were 11,616 charr with a total weight of 15,048 kg and 14,438 brook trout with a total weight of 11,619 kg reported landed in the fisheries in Lake Melville (SFA 1), northern (SFA 1) and southern Labrador (SFA 2) in 2003 during the open water fishing season. The total numbers of charr and trout landed in Labrador are unknown as there is no reporting system for fish caught either through the ice in the winter/spring or by recreational fishing in summer.

Historically, there are records for FSC fisheries beginning in 1999 for salmon and in 2001 for charr and trout. The historical landings are as follows:

	Salmon		Charr		Trout	
	Number	**Weight (kg)**	**Number**	**Weight (kg)**	**Number**	**Weight (kg)**
Northern Labrador & Lake Melville (SFA 1) & Southern Labrador (SFA 2)						
1999	3,824	9,800	-	-	-	-
2000	6,675	15,613	-	-	-	-
2001	6,478	16,288	9,373	11,248	22,589	17,215
2002	7,423	17,572	14,299	20,431	21,428	18,310
2003	8,653	22,108	11,602	15,018	14,438	11,619

Total returns to rivers

Total returns of small and large salmon to rivers in Labrador with counting facilities are listed in Table 5 for those years of available data. On the rivers with time series information, declines were observed for small and large salmon on Forteau Brook (1994-97), increasing small salmon for Sand Hill River (1970-73 & 1994-96) and increasing trends for small salmon at Southwest Brook (Paradise River, 1998-99), while large salmon decreased at Sand Hill River and Southwest Brook. In 2001, small and large salmon decreased on Southwest Brook compared to counts in 1998-99, but in the presence of the Resident Subsistence Fishery, while at English River (1999-2001), counts of small salmon declined over 2000 while large salmon increased. In 2002, the number of small salmon decreased, while the number of large salmon increased at Sand Hill River and Southwest Brook. There were 106 small salmon and 11 large salmon counted at Muddy Bay Brook. The numbers of small and large salmon decreased at the English River. In 2003, the number of small salmon at Sand Hill River increased slightly from 2002 while the number of large salmon increased considerably. In Southwest Brook and English River, the number of small and large salmon both decreased. At Muddy bay brook the number of large and small salmon both increased.

Environmental data

Daily water flow rates on Alexis River at the beginning of June in 2003 were similar to the mean daily flows, increasing quickly to maximum flows at the end of the first week in June. The daily flow rate then continued to decrease to minimum flow rates at the end of June. Daily flow rates then increased to mean flow rates for the first week in July. There were several spates up to and above maximum flow rates throughout July and August with water flow rates being near minimum levels between spates. In September, the water flow steadily declined from maximum to minimum flow rates (Fig. 2). On June 1, daily water flows on Eagle River in 2003 were above the minimum but below the mean for daily water flows. The water flow rates continued to decline remaining below average for the month of June and the first week in July. The water flows then began to

increase to mean water flow levels at the beginning of July and remained near mean values for the remainder of the month of July. Near the end of July and beginning of August there was an increase above the mean value. During the rest of August and into September water flow rates were similar to mean water flow rates until the end of September when they fell to minimum levels (Fig. 3). On June 1, daily flow conditions on Ugjoktok River in 2003 were near maximum flows. The flow rate then declined below the mean flow rate to near minimum levels by the end of June. For the first week in July, water flow rates began to increase to mean levels and remained above the mean until the end of July when there was a quick decrease to minimum levels followed by a quick increase to near mean levels. Water flow rates then remained between the mean and minimum values then decreasing to minimum values for the month of August. Water flow rates continued to remain near minimum values for the month of September (Fig. 4).

Salmon Rivers in Labrador

Anderson (1985) lists 120 rivers in Labrador from the southern border with Quebec to Cape Chidley. A summary is provided here along with estimates of rearing and drainage areas for all salmon rivers in Labrador including some omitted by Anderson (1985). There are some rivers that were left out of this list, i.e. Barge Bay Brook, and Southwest Tributary of White Bear River that will be added in the future as more information becomes available. Of these, there currently are about 81 rivers with salmon that have a drainage area bigger than about 50 km^2. Some of these rivers have only salmon in them whereas others have a mix of salmon, brook trout and Arctic charr. The survey information from these rivers if available are detailed in Table 6.

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Table 1. Atlantic salmon recreational fishery catch and effort data for Salmon Fishing Area 1, Labrador, 1974-2003. Ret.=retained; Rel.= released fish.

	Effort	Small (<63 cm)			Large (>= 63 cm)			Total (Small + Large)			
Year	Rod Days	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	CPUE
1974	801	347	.	347	311	.	311	658	.	658	0.82
1975	245	379	.	379	117	.	117	496	.	496	2.02
1976	922	891	.	891	368	.	368	1259	.	1259	1.37
1977	809	688	.	688	533	.	533	1221	.	1221	1.51
1978	704	875	.	875	432	.	432	1307	.	1307	1.86
1979	1367	905	.	905	430	.	430	1335	.	1335	0.98
1980	780	704	.	704	232	.	232	936	.	936	1.20
1981	422	669	.	669	195	.	195	864	.	864	2.05
1982	831	834	.	834	379	.	379	1213	.	1213	1.46
1983	834	488	.	488	137	.	137	625	.	625	0.75
1984	1074	702	.	702	222	.	222	924	.	924	0.86
1985	946	642	.	642	135	.	135	777	.	777	0.82
1986	741	421	.	421	129	.	129	550	.	550	0.74
1987	1011	854	.	854	141	.	141	995	.	995	0.98
1988	1629	1278	.	1278	171	.	171	1449	.	1449	0.89
1989	1296	1269	.	1269	144	.	144	1413	.	1413	1.09
1990	1245	563	.	563	115	.	115	678	.	678	0.54
1991	1056	130	.	130	8	.	8	138	.	138	0.13
1992	899	283	29	312	335	0	335	618	29	647	0.72
1993	422	121	124	245	22	25	47	143	149	292	0.69
1994	1036	453	933	1386	114	96	210	567	1029	1596	1.54
1995	880	500	854	1354	92	97	189	592	951	1543	1.75
1996	879	260	62	322	50	17	67	310	79	389	0.44
1997	1266	300	133	433	46	25	71	346	158	504	0.40
1998	813	256	448	704	61	109	170	317	557	874	1.08
1999	954	350	353	703	109	97	206	459	450	909	0.95
2000	1103	363	801	1164	79	232	311	442	1033	1475	1.34
2001	962	352	681	1033	75	130	205	427	811	1238	1.29
2002	651	129	482	611	28	140	168	157	622	779	1.20
2003	1032	174	777	951	36	633	669	210	1410	1620	1.57

Table 2. Atlantic salmon recreational fishery catch and effort data for Salmon Fishing Area 2, Labrador, 1974-2003. Ret. = retained fish; Rel = released fish. DFO data from 1974-1993 and Licence Stub Return System from 1994-2003.

	Effort	Small (<63 cm)			Large (>= 63 cm)			Total (Small + Large)			
Year	Rod Days	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	CPUE
1974	1978	1414	.	1414	201	.	201	1615	.	1615	0.82
1975	1784	2524	.	2524	56	.	56	2580	.	2580	1.45
1976	2331	2337	.	2337	152	.	152	2489	.	2489	1.07
1977	2507	2244	.	2244	160	.	160	2404	.	2404	0.96
1978	3131	1243	.	1243	152	.	152	1395	.	1395	0.45
1979	1817	2312	.	2312	60	.	60	2372	.	2372	1.31
1980	1692	2158	.	2158	320	.	320	2478	.	2478	1.46
1981	1423	2824	.	2824	105	.	105	2929	.	2929	2.06
1982	2290	1999	.	1999	162	.	162	2161	.	2161	0.94
1983	2294	1884	.	1884	161	.	161	2045	.	2045	0.89
1984	2057	1246	.	1246	103	.	103	1349	.	1349	0.66
1985	1756	1367	.	1367	59	.	59	1426	.	1426	0.81
1986	2310	1972	.	1972	154	.	154	2126	.	2126	0.92
1987	2750	2625	.	2625	277	.	277	2902	.	2902	1.06
1988	2875	2653	.	2653	288	.	288	2941	.	2941	1.02
1989	2986	2242	.	2242	264	.	264	2506	.	2506	0.84
1990	2607	1680	.	1680	144	.	144	1824	.	1824	0.70
1991	2427	1041	.	1041	36	.	36	1077	.	1077	0.44
1992	2813	1599	158	1757	208	10	218	1807	168	1975	0.70
1993	3600	1340	1255	2595	114	36	150	1454	1291	2745	0.76
1994	3296	1437	2242	3679	263	201	464	1700	2443	4143	1.26
1995	3221	1232	2005	3237	234	256	490	1466	2261	3727	1.16
1996	3966	1405	2591	3996	210	324	534	1615	2915	4530	1.14
1997	3688	1335	1293	2628	112	123	235	1447	1416	2863	0.78
1998	3941	1011	2201	3212	170	354	524	1181	2555	3736	0.95
1999	4529	1329	3229	4558	211	496	707	1540	3725	5265	1.16
2000	5332	1480	4169	5649	183	461	644	1663	4630	6293	1.18
2001	4635	1151	2984	4135	263	891	1154	1414	3875	5289	1.14
2002	4754	1328	3050	4378	179	377	556	1507	3427	4934	1.04
2003	3987	1232	3110	4342	190	395	585	1422	3505	4927	1.24

Table 3. Atlantic salmon recreational fishery catch and effort data for Salmon Fishing Area 14B, Labrador, 1974-2003. Ret. = retained fish; Rel. = released fish. DFO data from 1974-1993 and Licence Stub Return System from 1994-2003.

	Effort	Small (<63 cm)			Large (>= 63 cm)			Total (Small + Large)			
Year	Rod Days	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	CPUE
1974	2713	740	.	740	291	.	291	1031	.	1031	0.38
1975	2180	1069	.	1069	154	.	154	1223	.	1223	0.56
1976	3896	2498	.	2498	310	.	310	2808	.	2808	0.72
1977	3918	1662	.	1662	593	.	593	2255	.	2255	0.58
1978	2413	573	.	573	183	.	183	756	.	756	0.31
1979	2149	901	.	901	119	.	119	1020	.	1020	0.47
1980	2476	938	.	938	337	.	337	1275	.	1275	0.51
1981	3353	1698	.	1698	220	.	220	1918	.	1918	0.57
1982	3279	1271	.	1271	80	.	80	1351	.	1351	0.41
1983	3529	2000	.	2000	130	.	130	2130	.	2130	0.60
1984	3997	987	.	987	185	.	185	1172	.	1172	0.29
1985	3664	1092	.	1092	100	.	100	1192	.	1192	0.33
1986	4643	1071	.	1071	184	.	184	1255	.	1255	0.27
1987	4993	1887	.	1887	215	.	215	2102	.	2102	0.42
1988	5707	1592	.	1592	251	.	251	1843	.	1843	0.32
1989	4895	1173	.	1173	53	.	53	1226	.	1226	0.25
1990	5075	1066	.	1066	98	.	98	1164	.	1164	0.23
1991	4017	1152	.	1152	49	.	49	1201	.	1201	0.30
1992	4630	856	64	920	238	0	238	1094	64	1158	0.25
1993	5296	1047	414	1461	242	30	272	1289	444	1733	0.33
1994	4117	659	506	1165	78	50	128	737	556	1293	0.31
1995	3618	761	443	1204	82	155	237	843	598	1441	0.40
1996	4348	900	1123	2023	74	148	222	974	1271	2245	0.52
1997	3440	730	761	1491	*	418	418	730	1179	1909	0.55
1998	3534	864	1109	1973	*	351	351	864	1460	2324	0.66
1999	2109	397	825	1222	*	338	338	397	1163	1560	0.74
2000	4210	718	2125	2843	*	753	753	718	2878	3596	0.85
2001	2389	546	975	1521	*	447	447	546	1422	1968	0.82
2002	3346	614	1520	2134	*	461	461	614	1981	2595	0.78
2003	4211	639	1959	2598	*	550	550	639	2509	3148	0.75

Table 4. Atlantic salmon recreational fishery catch and effort data for Labrador (SFA 1, 2, and 14B), 1974-2003. Ret. = retained fish; Rel = released fish. DFO data from 1974-1993 and Licence Stub Return System from 1994-2003.

	Effort	Small (<63 cm)			Large (>= 63 cm)			Total (Small + Large)			
Year	Rod Days	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	CPUE
1974	5492	2501	.	2501	803	.	803	3304	.	3304	0.60
1975	4209	3972	.	3972	327	.	327	4299	.	4299	1.02
1976	7149	5726	.	5726	830	.	830	6556	.	6556	0.92
1977	7234	4594	.	4594	1286	.	1286	5880	.	5880	0.81
1978	6248	2691	.	2691	767	.	767	3458	.	3458	0.55
1979	5333	4118	.	4118	609	.	609	4727	.	4727	0.89
1980	4948	3800	.	3800	889	.	889	4689	.	4689	0.95
1981	5198	5191	.	5191	520	.	520	5711	.	5711	1.10
1982	6400	4104	.	4104	621	.	621	4725	.	4725	0.74
1983	6657	4372	.	4372	428	.	428	4800	.	4800	0.72
1984	7128	2935	.	2935	510	.	510	3445	.	3445	0.48
1985	6366	3101	.	3101	294	.	294	3395	.	3395	0.53
1986	7694	3464	.	3464	467	.	467	3931	.	3931	0.51
1987	8754	5366	.	5366	633	.	633	5999	.	5999	0.69
1988	10211	5523	.	5523	710	.	710	6233	.	6233	0.61
1989	9177	4684	.	4684	461	.	461	5145	.	5145	0.56
1990	8927	3309	.	3309	357	.	357	3666	.	3666	0.41
1991	7500	2323	.	2323	93	.	93	2416	.	2416	0.32
1992	8342	2738	251	2989	781	10	791	3519	261	3780	0.45
1993	9318	2508	1793	4301	378	91	469	2886	1884	4770	0.51
1994	8449	2549	3681	6230	455	347	802	3004	4028	7032	0.83
1995	7719	2493	3302	5795	408	508	916	2901	3810	6711	0.87
1996	9193	2565	3776	6341	334	489	823	2899	4265	7164	0.78
1997	8394	2365	2187	4552	158	566	724	2523	2753	5276	0.63
1998	8288	2131	3758	5889	231	814	1045	2362	4572	6934	0.84
1999	7592	2076	4407	6483	320	931	1251	2396	5338	7734	1.02
2000	10645	2561	7095	9656	262	1446	1708	2823	8541	11364	1.07
2001	7986	2049	4640	6689	338	1468	1806	2387	6108	8495	1.06
2002	8751	2071	5052	7123	207	978	1185	2278	6030	8308	0.95
2003	9230	2045	5846	7891	226	1578	1804	2271	7424	9695	1.05

Table 5. Summary of total returns to rivers in Labrador. Total returns include angling catches below counting facilities plus count from counting fence or mark-recapture population estimate.

	Forteau Brook		Pinware River		Sand Hill River		Paradise River & Southwest Brook		Muddy Bay Brook		Big Brook		English River	
Year	Small	Large	Small	Large	Small	Large	Small	Large	Small	Large	Small	Large	Small	Large
1970	-	-	-	-	3600	138	-	-	-	-	-	-	-	-	-	-
1971	-	-	-	-	3596	266	-	-	-	-	-	-	-	-	-	-
1972	-	-	-	-	2038	175	-	-	-	-	-	-	-	-	-	-
1973	-	-	-	-	4761	504	-	-	-	-	-	-	-	-	-	-
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1994	458	77	-	-	2180	730	-	-	-	-	-	-	-	-	-	-
1995	461	147	-	-	2796	560	-	-	-	-	-	-	-	-	-	-
1996	-	-	-	-	3319	414	-	-	-	-	-	-	-	-	-	-
1997	223	56	874	179	-	-	-	-	-	-	-	-	530	104	-	-
1998	-	-	-	-	-	-	-	-	110	4	-	-	-	-	-	-
1999	-	-	-	-	-	-	4681	491	331	43	-	-	790	194	59	48
2000	-	-	-	-	-	-	-	-	-	-	-	-	982	151	367	15
2001	-	-	-	-	-	-	-	-	321	32	-	-	-	-	224	41
2002	-	-	-	-	3155	567	-	-	235	34	106	11	-	-	190	31
2003	-	-	-	-	3157	621	-	-	158	16	394	31	-	-	133	19

Table 6. Drainage areas, parr habitat and potential adult production for Labrador rivers including references. Numbers in bold type are estimated from SFA totals. [1] indicates that drainage basin has been re-surveyed and is different than in Anderson (1985). Rivers in bold and Italic have angling data for some years but not all years.

No.	River	SFA	Region	Total Watershed Drainage (km2)		Parr rearing habitat			Reference
				Total	Accessible	Accessible (units)	Inaccessible (units)	Potential adult production	
1	***Forteau Brook***	14B	Straits shore	389	220	1426	1097	5000	1
2	***Lance aux Loup Brook***	14B	Straits shore	130	94	936	359	281	1
3	***Pinware River***	14B	Straits shore	2636	2140	46691	10808	14007	2,1
4	Wiseman Brook	14B	Straits shore	14	14	***280***	***0***	***84***	0,2
5	Black Bay Brook	14B	Straits shore	79	79	***1579***	***0***	***474***	0,2
	Subtotal SFA 14B	**14B**	**Straits shore**	**3248**	**2547**	**50912**	**12264**	**19846**	
6	Temple Brook	2	Southern	181	136	2311	***649***	693	1
7	St. Peters River	2	Southern	140	16	65	510	20	1
8	***St. Charles River*** [1]	2	Southern	321	321	6237	0	1871	2,1
9	***Mary's Hr River*** [1]	2	Southern	458	458	6526	0	1958	2,1
10	Hoop Pole Brook [1]	2	Southern	58	58	***832***	***0***	***250***	0,2
11	***St. Lewis River*** [1]	2	Southern	2428	673	13723	35814	4117	2,1
12	Port Marnham Brook [1]	2	Southern	142	142	***2036***	***0***	***611***	0,2
13	Deer Harbour [1]	2	Southern	84	84	***1205***	***0***	***361***	0,2
14	Notleys Brook	2	Southern	49	49	***703***	***0***	***211***	0,2
15	Bobbys Brook	2	Southern	245	167	1360	641	408	1
16	Black Water Brook	2	Southern	135	135	1936	0	581	2,0
17	***Alexis River*** [1]	2	Southern	3112	912	8919	21522	2676	2,1
18	***Shinneys Waters*** [1]	2	Southern	202	202	1020	0	306	2,1
19	***Gilbert River*** [1]	2	Southern	594	0	0	3238	0	2,5
20	***Brook of St. Michael's Bay***	2	Southern	50	50	***713***	***0***	***214***	0,2
21	Seven Mile Pond River (River 14)	2	Southern	98	98	2128	0	638	5
22	***White Bear Arm River***	2	Southern	233	233	4053	0	1216	5
23	River 16	2	Southern	45	45	833	0	250	5
24	***Hawke River***	2	Southern	1891	1891	46366	0	13910	5
25	Caplin Bay Brook	2	Southern	150	150	1591	0	477	5
26	Partridge Bay Brook	2	Southern	70	70	872	0	262	5
27	Shoal Bay River 20	2	Southern	119	119	1067	0	320	5
28	Shoal Bay Brook	2	Southern	18	18	581	0	174	5
29	River 22	2	Southern	13	13	340	0	102	5
30	Black Bear River	2	Southern	645	645	7921	0	2376	5
31	Open Bay Brook	2	Southern	39	39	360	0	108	5
32	Porcupine Harbour River	2	Southern	155	33	368	1381	110	5
33	River 26	2	Southern	70	70	252	0	76	5
34	Reeds Pond Brook	2	Southern	233	233	3175	0	953	5
35	***Sand Hill River*** [1]	2	Southern	1603	1509	53154	5503	***15946***	9
36	Muddy Bay Brook [1]	2	Southern	344	261	***3743***	***1190***	***1123***	2,8
37	Paradise River [1]	2	Southern	5778	5778	56425	0	16928	2,6
38	***Eagle River***	2	Southern	10824	9793	111516	***5576***	***33456***	5,6
39	Southwest Brook	2	Southern	525	525	***7529***	***0***	***2259***	0
40	***White Bear River***	2	Southern	1021	1021	22228	0	6668	6,1
41	North River [1]	2	Southern	2215	2215	***31766***	***0***	***9530***	8
	Subtotal SFA 2	**2**	**Southern**	**34288**	**28160**	**403855**	**76024**	**121158**	

Table 6. cont'd

42	Flatwater Brook	1A	Lake Melville	299	299	***5966***	***0***	***1790***	8
43	English River	1A	Lake Melville	640	33	662	12286	199	3
44	Kenemich River	1A	Lake Melville	699	699	11570	0	3471	3
45	Kenamu River	1A	Lake Melville	4403	4403	***87856***	***0***	16500	10
46	Traverspine River	1A	Lake Melville	728	613	19749	3714	5925	3
47	Churchill River	1A	Lake Melville	93415	1062	***21191***	***1842783***	***6357***	0,11
48	Goose River	1A	Lake Melville	3432	1938	33560	25865	10068	4
49	Cape Caribou River	1A	Lake Melville	546	546	14922	0	4477	3
50	Beaver River	1A	Lake Melville	1878	1624	46251	7245	13875	3
51	Susan River	1A	Lake Melville	363	363	11166	0	3350	3
52	Naskaupi River	1A	Lake Melville	12691	1269	***25323***	***227909***	***7597***	1,9
53	Crooked River	1A	Lake Melville	2391	2391	46836	0	14051	3
54	Sebaskachu River	1A	Lake Melville	580	580	1893	0	568	3
55	Mulligan River	1A	Lake Melville	1062	1062	9902	0	2971	5
Subtotal SFA 1A				**123127**	**16881**	**336847**	**2119802**	**91199**	
56	***Double Mer***	1B	Northern	1425	1425	19502	0	5851	5
57	River 49	1B	Northern	855	855	18635	0	5591	5
58	***Tom Luscombe Brook***	1B	Northern	1010	1010	***15831***	***0***	***4749***	8
59	West Brook	1B	Northern	149	149	***2335***	***0***	***701***	8
60	Middle Brook	1B	Northern	323	323	***5063***	***0***	***1519***	8
61	53/54 Pottles Bay River	1B	Northern	135	135	***2116***	***0***	***635***	8
62	55 Byron Bay River	1B	Northern	163	163	***2555***	***0***	***766***	0
63	***Big Brook (Michaels River)***	1B	Northern	793	793	22059	0	6618	4
64	Jeanette Bay Brook	1B	Northern	67	67	1523	0	457	4
65	River 58	1B	Northern	13	13	***204***	***0***	***61***	0
67	Tukialik River	1B	Northern	47	47	684	0	205	4
68	Pamiulik River	1B	Northern	493	493	14882	0	4465	4
69	Stag Bay Brook	1B	Northern	155	155	4760	0	1428	4
70	Rattling Brook	1B	Northern	285	285	11308	0	3392	4
71	***Big River***	1B	Northern	2849	2849	10879	0	3264	4
72	Adlavik River	1B	Northern	233	233	7186	0	2156	4
73	River 65	1B	Northern	39	39	533	0	160	4
74	River 66	1B	Northern	29	29	***455***	***0***	***136***	7
75	Makkovik Brook	1B	Northern	111	90	2179	520	654	4
76	Makkovik Rook	1B	Northern	259	259	5231	0	1569	4
77	South Brook	1B	Northern	399	399	3270	0	981	4
78	Kaipokok River	1B	Northern	2499	2242	24006	2756	7202	4
79	English River	1B	Northern	545	125	2686	6087	3032	4,12
80	River 72	1B	Northern	399	399	840	0	252	4
81	Kanairiktok River	1B	Northern	12274	0	0	133109	0	4
82	Little Bay River	1B	Northern	244	244	***3824***	***0***	***1147***	0
83	River 75	1B	Northern	475	475	***7445***	***0***	***2234***	0
84	***Adlatok (Ugjoktok) River***	1B	Northern	11106	8070	130000	48918	39000	4
85	***Hunt River***	1B	Northern	1344	1344	24657	0	7397	3
86	River 78	1B	Northern	338	338	***5298***	***0***	***1589***	0
87	***Flowers River***	1B	Northern	1443	1443	29084	0	8725	3
88	Rivers 80/81	1B	Northern	310	310	***4859***	***0***	***1458***	0
89	Sango Brook	1B	Northern	806	685	15561	2745	4668	0
Subtotal SFA 1B				**41615**	**25485**	**399449**	**194135**	**122062**	
Total				**202278**	**73073**	**1191064**	**2402225**	**354265**	

Key to references

0 No habitat or obstructions surveys assumed 100% accessible
1 Anderson (1985)
2 Kelly, pers. comm. (2003)
3 Murphy & Porter (1974)
4 Murphy (1973)
5 Murphy (1972)
6 Murphy (1971)
7 Murphy obstructions survey (unpublished)
8 Peet (1971)
9 Reddin 1997 (unpublished data)
10 Riche (1965)
11 Newfoundland & Labrador Hydro Survey
12 English River project survey data

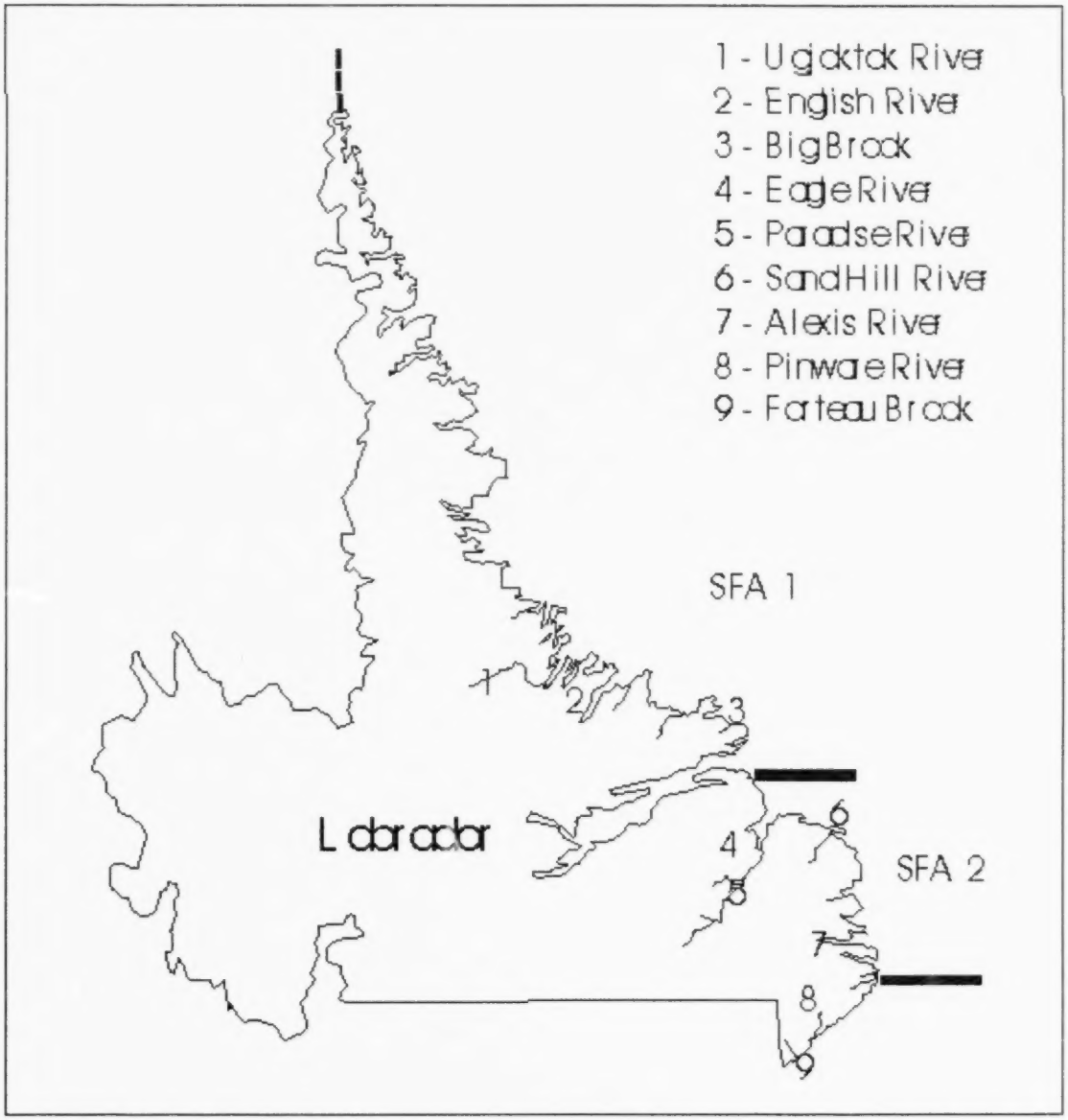

Figure 1. Labrador showing locations of Salmon Fishing Areas and rivers mentioned in the text.

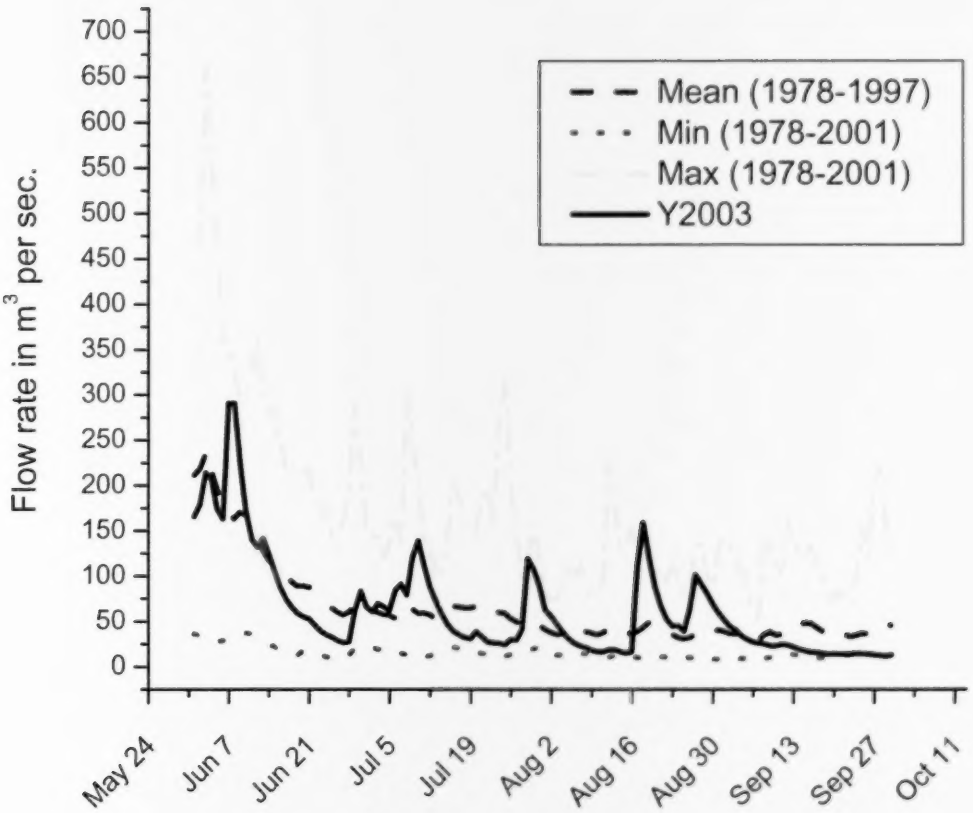

Figure 2. Flow rates for Alexis River indicating mean flows for 1978-97 with a comparison to mean, minimum and maximum flow rates in 2003.

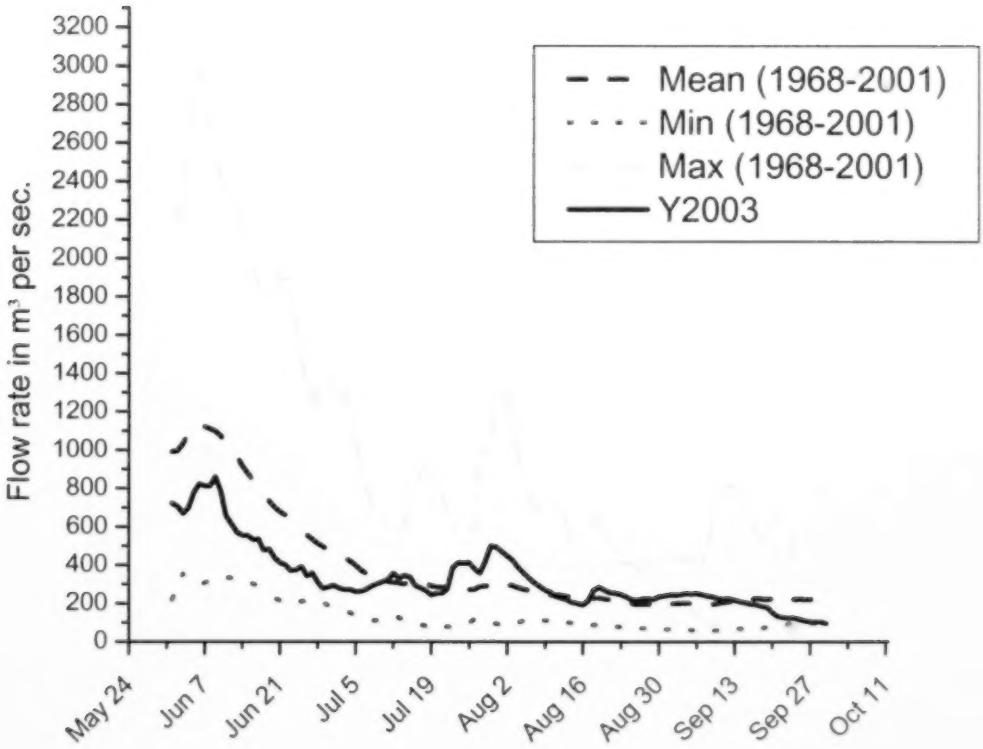

Figure 3. Flow rates for Eagle River indicating mean flows for 1967-97 with a comparison to mean, minimum and maximum flow rates in 2003.

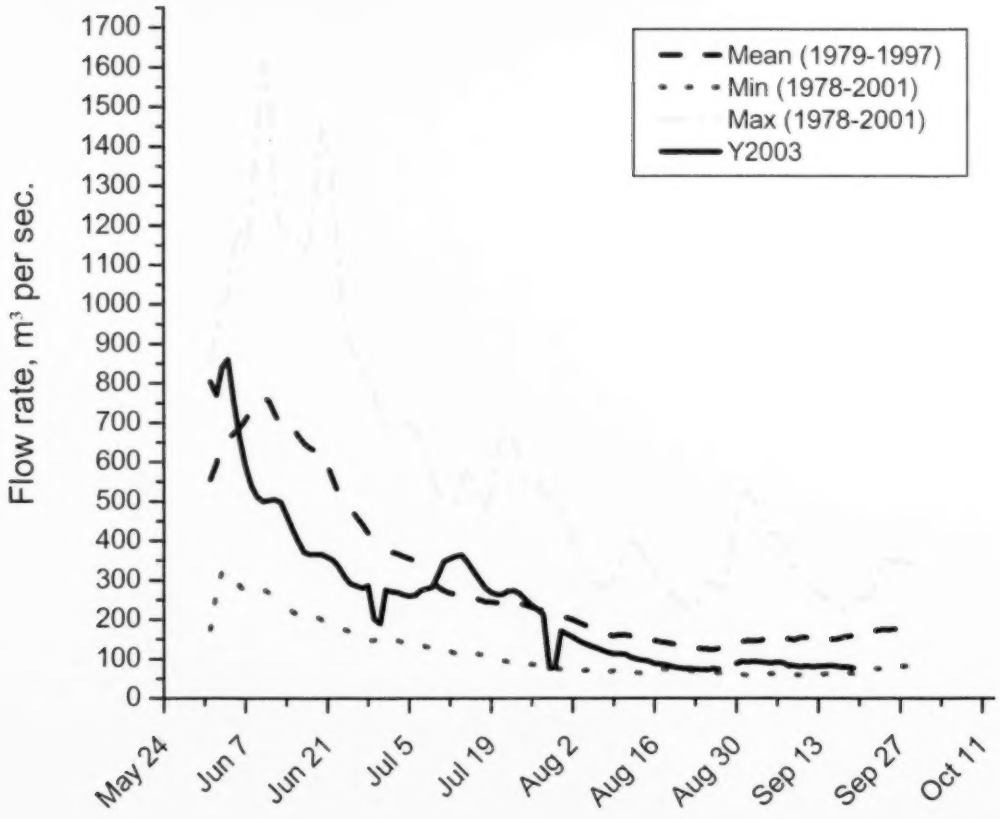

Figure 4. Flow rates for Ugjoktok River indicating mean flows for 1979-97 with a comparison to mean, minimum and maximum flow rates in 2003.